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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,225	11/14/2001	Timothy J. Schmidt	AVI-020	6748
21567	1990	05/28/2004	EXAMINER	
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ART UNIT		PAPER NUMBER		

1746

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
09/987,225	SCHMIDT ET AL	
Examiner	Art Unit	
Jonathan S Crepeau	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2001.
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) 46-54 is/are allowed.
6) ☒ Claim(s) 1-5, 7-18, 20-24, 27-31, 33-36 and 38-44 is/are rejected.
7) ☒ Claim(s) 6, 19, 25, 26, 32, 37 and 45 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Claim Suggestions

1. In claim 1, line 4, "wherein the switch mode power conditioning circuitry;" appears to be an incomplete recitation and should be changed to "wherein the switch mode power conditioning circuitry is electrically coupled to each fuel cell and configured to electrically condition the electrical energy generated by the fuel cells;". Appropriate correction is suggested but not required.

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Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 5, 7-9, 11, 28, 29, 31, 33, 34, and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Fuglevand et al (U.S. Patent 6,428,918). Regarding claims 1, 5, 7, 11, 28, 31, 33, and 36, the reference teaches a fuel cell power system comprising a plurality of fuel cells (14) and power conditioning circuitry (100) configured to condition the energy generated from

the fuel cells (see Figs. 4-6). The circuitry is of the switch mode type and comprises an energy storage device and a switch (see col. 13, line 66). The system further comprises a controller (102) for monitoring the electrical status of the fuel cell and controlling the power conditioning circuitry in response thereto (see col. 16, line 13 et seq.). The controller provides a pulse width modulated control signal to control the switching and to vary the duty cycle of the control signal, such that the operating point of the fuel cell is adjusted (see col. 16, line 13 et seq.). Regarding claims 2 and 8, the circuitry regulates the voltage output of the fuel cell (see col. 17, line 40, et seq.). Regarding claims 3, 9, 29, 34, the controller monitors the voltage of the fuel cell and modifies the duty cycle of the control signal responsive to the voltage being below a threshold value (see col. 17, line 47).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

4. Claims 1-3, 5, 7-9, 11, 28, 29, 31, 33, 34, and 36 are rejected under 35 U.S.C. 102(a) as being anticipated by WO 01/78176 (Fuglevand et al). The WO '176 reference is applied for the same reasons as stated in section 3 above, and therefore is also anticipatory of the instant claims.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 10, 16, 17, 18, 20, 21, 41-44 rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/78176 in view of Czajkowski et al (U.S. Patent 6,503,649).

WO 01/78176 is applied for the reasons stated above. However, the reference does not expressly teach that the energy storage device is a battery, as recited in claims 10, 16, and 41.

Czajkowski et al is directed to a fuel cell power system comprising energy storage devices connected with fuel cells. In column 6, line 42, the reference teaches that the energy storage device may comprise a battery, ultracapacitor or regenerative fuel cell.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Czajkowski et al indicates that batteries and capacitors are equivalent as energy storage devices in fuel cell systems. As such, the artisan would be sufficiently skilled to substitute the battery of Czajkowski et al. for the capacitor of WO '176. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

7. Claims 4, 22-24, 27, 30, and 35 rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/78176.

WO 01/78176 is applied for the reasons stated above. However, the reference does not expressly teach that the average voltage of the fuel cell is measured, as recited in claims 4, 30, and 35. Additionally, the reference does not expressly teach that a plurality of pulse width modulated control signals are provided by a controller, as recited in claim 22.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use an average fuel cell voltage in the control scheme of WO '176. Such voltage measurements are known for use in fuel cell systems and increase the accuracy and reliability of the measurements. As such, the artisan would be motivated to use an average fuel cell voltage measurement in the control scheme of WO '176.

Further, the recitation of a plurality of control signals is not considered to distinguish over the reference. When using a plurality of power conditioning circuits, as shown in Figure 4A of the reference, it would be obvious to use a plurality of control signals to control them. As such, this limitation is not considered to distinguish over the reference.

8. Claims 12-15 and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Czajkowski et al in view of WO 01/78176.

Czajkowski et al is directed to a fuel cell system comprising banked fuel cells, energy storage devices, and DC to AC converters, all connected by parallel buses and connected to a load (57) (see Fig. 3).

The reference does not expressly teach that the converters are controlled by providing pulse width modulated control signals, as recited in claims 12 and 38.

As set forth above, WO 01/78176 teaches a pulse width modulated control signal to control the switching of a power converter in a fuel cell system.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the control scheme of WO '176 in the system of Czajkowski et al. On page 23, line 5, WO '176 teaches that "the depicted methodology is utilized for controlling the voltage of fuel cell power system 10 to a certain set point, such as an output voltage from fuel cell power system 10 of approximately 26 volts." As such, the artisan would be motivated to use the control scheme of WO '176 in the system of Czajkowski et al. in order to operate the system at a certain set point.

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1, 2, 5, 7, 8, 11, 28, 29, 31, 33, and 36 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-57 of U.S. Patent No. 6,428,918. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '918 patent anticipate the instant claims. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993). In particular, the recitation of pulse-width modulation in claim 10 of the '918 patent is considered to be anticipatory of the instantly claimed feature of varying the duty cycle. It is submitted that the process of pulse-width modulating inherently includes the step of varying the duty cycle (i.e., varying the width of the pulse). As such, the instant claims define an obvious variation of the claims of the '918 patent.

Allowable Subject Matter

11. Claims 46-54 are allowed.
12. Claims 6, 19, 25, 26, 32, 37, and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter:

The instant claims each recite that control signals are applied to different ones of the plurality of power conditioning circuits at different moments in time. Fuglevand et al (US 6,428,918 or WO 01/78176), the closest prior art, does not teach or fairly suggest this limitation. Accordingly, the instant claims contain allowable subject matter.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau
Patent Examiner
Art Unit 1746
May 26, 2004